



University of Illinois, Metropolitan Group Hospitals Program in General Surgery

Rotation Title: Vascular and Thoracic Surgery- Advocate Lutheran General Hospital

Level of Training: PGY 1, PGY IV

Attending in Charge of Rotation: Dr. John White / Dr. Najjar

Faculty: Dr. John White, Dr. Najjar, Dr. Thomas Painter, Dr. Suzanne Woloson, Dr. Axel Joob (thoracic surgeon)

ASSESSMENT:

Monitoring of the accomplishment of the stated objectives will be performed using the following methods:

1. 360 degree evaluation: end of rotation evaluation of resident performance to assess the Resident's demonstration of Core Competencies with respect to the stated objectives by faculty, other team resident members, students, nursing staff, and patients.
2. Case Logs: auditing of operative cases pertinent to the specialty in the Surgical Operative Log.
3. Written Examination: performance on the annual ABSITE examination, Cardiovascular and Respiratory systems section.

Surgical Skills Advancement:

By the end of the rotation, have completed (per necessity) the OSAT/OSCA for the following procedures:

Femoropopliteal Bypass

Carotid endarterectomy planned for 2012

COMPETENCY BASED LEARNING OBJECTIVES

Patient Care:

1. Perform a complete and thorough history and physical examination, with emphasis in elements unique to vascular and thoracic surgery patients.
2. Initiate the laboratory evaluation and any other initial diagnostic studies with an understanding of the tests to be ordered.
3. Make informed decisions about diagnostic and therapeutic interventions on vascular and thoracic surgery patients with the guidance of senior residents and faculty.
4. Be proficient in the preoperative preparation of the patients for vascular/thoracic surgery and routine postoperative care.
5. Understand basic pathophysiology of vascular/thoracic disease and begin to master the skills necessary to care for the ICU patient under the guidance of the senior residents and faculty members.
6. Understand basic pathophysiology of vascular/thoracic disease, principles of resuscitation, preoperative and postoperative care of vascular/thoracic surgery patients under the guidance of the senior residents and attendings.
7. Understand the basic indications for common radiological and interventional studies used in the care of vascular/thoracic surgery patients such as duplex US, CXR, CT, MRA, PET, non-invasive cardiac function tests, and angiography.
8. Demonstrate the ability to effectively set priorities and coordinate the care of vascular/thoracic patients.
9. Physical Examination
 - a. To understand the significance of observational signs, such as skin color and texture, swelling, gangrene, and ulcers.
 - b. To detect and evaluate peripheral pulses, bruits, thrills, skin temperature, edema, tissue turgor, and vascular dimensions.
 - c. To develop the skills necessary to palpate the abdomen, neck, and extremities in order to localize sites of tenderness and to recognize the presence of masses and abnormal pulsations.

- d. To assess for lymphadenopathy, breath sounds, such as decreased breath sounds with pneumothorax or pleural effusion.
- e. To be capable of performing basic neurological evaluations.
- f. To interpret physical findings, understand how they contribute to the diagnosis, recognize their limitations, and be aware of other diseases that might mimic the findings.
- g. To be familiar with commonly used noninvasive instruments and modalities, such as Doppler ultrasound, duplex and color-flow scanning, B-mode imaging, plethysmography (air, mercury, and impedance), magnetic resonance imaging (MRI), magnetic resonance angiography (MRA), PET, and computerized tomography (CTA).

Medical Knowledge:

Aneurysmal Disease

To understand the incidence and prevalence of aneurysmal disease according to age:

1. To understand the natural history of abdominal aortic aneurysms.
2. To understand the genetic distribution of the disease.
3. To understand the roles of ultrasound, angiography, CT and MRI/MRA in screening and in planning surgery.
4. To understand the indications for surgical repair and the factors that contribute to surgical decision making.

Peripheral Vascular Occlusive Disease (Acute and Chronic)

1. To define the normal arterial anatomy of the peripheral vascular system including commonly encountered anatomic variations.
2. To recognize the physiologic and pathophysiologic collateral circulatory routes which commonly develop in response to occlusive disease.
3. To appreciate the multiple etiologies of chronic peripheral vascular ischemia including atherosclerosis, aneurysm, entrapment syndromes, trauma, and a variety of non-atherosclerotic occlusive entities.
4. To understand the signs and symptoms characteristic of acute arterial ischemia and the differential diagnosis, the importance of assessing the degree of acute ischemia and appreciate the significance of the duration of acute ischemia.
5. To recognize the importance of antecedent clinical entities which may predispose to acute peripheral ischemia including atrial fibrillation, prior myocardial infarction, aortic dissection, and hypercoagulopathies.

6. To appreciate the significance of initial electrolyte, acid base and other laboratory parameters useful in assessing the magnitude of ischemia to define the indications for appropriate therapy.
7. To understand the characteristic signs and symptoms of chronic peripheral vascular ischemia relative to the patient's history and physical examination.
8. To appreciate the sequela of reperfusion following acute ischemia in terms of systemic effects as well as the local effects warranting fasciotomy including the anatomy and physiology of fasciotomy.
9. To understand indications for primary amputation.

Renal Artery Disease

1. To define normal renal artery anatomy and collateral pathways important in renal artery disease.
2. To understand the etiology, pathology and natural history of these renal artery lesions:
 - a. Renal artery atherosclerosis
 - b. Renal artery fibromuscular dysplasia
 - c. Renal artery aneurysm
 - d. Embolic occlusion
3. To understand the exocrine and endocrine function of the kidney, and relate these to the structure and function of the nephron unit.
4. To understand the renin-angiotensin axis in the absence and presence of renal artery disease.
5. To describe the mechanisms of renovascular hypertension and renovascular insufficiency (i.e., ischemic nephropathy) and to understand how these differ for unilateral and bilateral renal artery disease.
6. To describe the clinical features of renovascular hypertension and renovascular insufficiency in contrast to essential hypertension and parenchymal renal failure.
7. To define the applications and limitations of available screening/imaging studies for renal artery disease.
8. To describe the strategies, options and anticipated results of medical management for the various renal artery lesions.

Visceral Ischemia

1. To define the normal arterial and venous anatomy of the mesenteric circulation and to be familiar with the more frequently encountered anatomic variations.
2. To recognize the physiologic and pathophysiologic collateral circulation to the gastrointestinal tract that may develop in response to occlusive disease of the main

mesenteric vessels.

3. To understand the multiple etiologies of acute mesenteric ischemia including embolism, thrombosis, dissection, venous occlusion, trauma, and gut ischemia following aortic reconstruction.
4. To understand the multiple possible etiologies of syndromes of chronic mesenteric ischemia including atherosclerosis, aneurysm, extrinsic compression syndromes, and other nonatherosclerotic arteriopathies.
5. To understand the characteristic initial signs and symptoms suggestive of acute mesenteric ischemia and how symptoms and physical findings may differ from other causes of the acute abdomen.
6. To define preexistent clinical conditions that may predispose to, or support the clinical diagnosis of acute mesenteric ischemia, e.g. atrial fibrillation, previous myocardial infarction (mesenteric embolism), severe cardiopulmonary dysfunction (non-occlusive ischemia), history of postprandial pain and weight loss, known aortic dissection (mesenteric thrombosis), hypercoagulable states (mesenteric venous thrombosis).
7. To define the appropriate diagnostic evaluation for suspected intestinal ischemia following aortic surgery.
8. To understand the usefulness of alternative imaging techniques (CT, MRI) for the diagnosis of acute mesenteric venous thrombosis. To understand the characteristic signs and symptoms of chronic mesenteric ischemia and how other aspects of patients' history (e.g. previous aortic surgery) or physical examination (e.g. aortoiliac occlusive disease) may suggest the presence of associated visceral arterial occlusive disease.
9. To understand the usefulness of portomesenteric duplex ultrasound scanning for elective noninvasive evaluation of the major visceral vessels.
10. To define the indications for arteriography (or alternative vascular imaging studies) in patients with suspected chronic mesenteric ischemia and understand the arteriographic findings that are considered diagnostic of this condition.
11. To recognize the characteristic arteriographic findings in atypical causes of mesenteric arterial compromise.

Cerebrovascular Disease

1. To describe the anatomy of the arch, great vessels, and intracranial arteries.
2. To understand the different etiologies of carotid artery disease.
 - a. Atherosclerosis
 - b. Fibromuscular dysplasia
 - c. Traumatic occlusion

d. Acute Dissection

3. To define hemispheric, non-hemispheric, and non-specific symptoms.
4. To differentiate among transient ischemic attack (TIA), reversible ischemic neurologic deficit (RIND), stroke in evolution and completed stroke.
5. To describe the arterial and neurologic examination and their importance in caring for patients with carotid artery disease.
6. To describe the relationship between carotid artery atherosclerosis and the clinical syndrome of vertebrobasilar insufficiency.
7. To describe the appropriate evaluation for patients with each of the above clinical presentations including the role of Duplex scans, CT scans, MRA and conventional angiography.
8. To discuss the non-surgical and surgical treatment of acute ischemic syndromes including stroke.
9. To be able to discuss the potential role of endovascular treatment for cerebrovascular disease

Thoracic Outlet Syndrome

1. To understand the anatomy of the thoracic outlet to include anatomic variations in bones, muscles, and cervical ribs.
2. To understand that pain is a principal symptom of neurologic type of thoracic outlet and that distribution of pain according to the site of compression.
3. To recognize the arterial symptoms (embolization to hand and forearm, post-stenotic dilatation, and subclavian artery occlusion) and venous symptoms (subclavian vein thrombosis for clinical diagnosis).
4. To define differential diagnoses of thoracic outlet to include cervical disc syndrome, carpal tunnel syndrome, orthopedic shoulder problems, spinal cord tumor disease, angina pectoris, and Pancoast's tumor.
5. To understand and have knowledge of tests used to evaluate thoracic outlet, i.e. Adson's test, hyperabduction test, and costoclavicular test.
6. To understand the role of vascular lab in the diagnosis using duplex evaluation to detect thrombosis of the subclavian vein and arterial studies of the upper extremity.
7. To be familiar with thrombolytic therapy in the management of subclavian vein thrombosis.
8. To have an understanding of the treatment options to include conservative approaches such as physical therapy and treatment of muscle spasm as well as surgical approaches such as first rib resection.

Diabetic Foot Problems

1. To define the normal arterial and venous anatomy of the circulation of the foot.
2. To demonstrate an understanding of ischemia, neuropathy, and infection as part of the pathogenic mechanisms underlying problems of the diabetic foot.
3. To demonstrate an understanding of the presenting signs and symptoms of three pathogenic mechanisms underlying problems of the diabetic foot.
4. To understand the limitations of various non-invasive tests in the diagnosis of ischemia in the presence of diabetes.
5. To understand the role of angiography in the evaluation of ischemia for patients with diabetes.
6. To understand priorities of management in diabetic patients with foot problems to include timing and methods of debridement in drainage for sepsis, metabolic control, evaluation of ulcer- depth, sepsis, involvement of bone, tendon options for conservative management, role of foot gear, weight bearing, when to evaluate for ischemia, and options in the management of the non-ischemic, purely neuropathic ulcer.
7. To understand the principles and techniques of wound care, dressing changes, and debridement.
8. To maintain appropriate control of diabetes peri-operatively.
9. To work in conjunction with physical therapy wound care in caring for diabetic ulcers.
10. To understand the increased cardiac risk that diabetic patients face and prepare them accordingly for the operating room (stress test, echo, EKG)

Complications of Vascular Therapy

1. To understand the expected incidence and etiologies of wound healing complications including hematoma, infection, and lymphocele.
2. To recognize non-vascular complications associated with arterial therapy including cardiac ischemia, renal failure, and neurologic deficits.
3. To recognize the clinical manifestations of pseudoaneurysm following arteriography, percutaneous transluminal angioplasty, and bypass grafting.
4. To understand characteristic symptoms and signs of secondary aortoenteric fistula/erosion including prior aortic graft implantation, herald gastrointestinal bleeding, fever, and concomitant anastomotic false aneurysm.
5. To understand the characteristic signs and temporal presentation of acute versus late-appearing graft infections including sepsis, GI or perigraft bleeding, fever, malaise, false aneurysm, abdominal, back, or groin pain.

6. To understand the characteristic initial signs and symptoms suggestive of colon ischemia.
7. To define the appropriate diagnostic evaluation for suspected colon ischemia following aortic surgery including the use of rigid and flexible sigmoidoscopy, colonoscopy, and operative exploration.
8. To recognize the symptoms and signs of limb ischemia associated with graft thrombosis.
9. To define the appropriate diagnostic evaluation of graft occlusion based on severity of limb ischemia.
10. To understand the clinical symptoms and signs, and ECG features of cardiac ischemic.
11. To define the parameters of serologic and urine testing that characterize acute renal failure.
12. To understand the role of prophylactic antibiotics in the prevention wound and graft infections.
13. To understand the role of pre-operative testing, intra-operative monitoring, and post-operative measures to prevent cardiac ischemia.

Vascular Trauma

1. To understand the mechanism of vascular injury to the upper extremity, thoracic aorta, abdominal aorta and its branches, and lower extremities.
2. To understand the characteristic signs and symptoms of acute vascular compromise.
3. To understand the usefulness and define the characteristic diagnostic finding of alternative imaging techniques (ie. two plane x-ray, Doppler/duplex color flow ultrasonography, venography, angiography, MRI and CT scans) in the management of vascular trauma.
4. To understand the characteristic signs and symptoms of acute arterial injury.
5. To define the clinical features of major arterial injury.
6. To understand the indications for noninvasive (Doppler or duplex color flow ultrasonography, CT, MRI) and invasive (arteriography, venography) diagnostic studies.
7. To define the preoperative assessment and management of the patient with a major arterial injury.
8. To understand the characteristic signs and symptoms of acute venous injury.
9. To define the clinical features of major venous injury.
10. To understand the indications for noninvasive (Doppler or duplex color flow ultrasonography, CT, MRI) and invasive (venography) diagnostic studies.

11. To define the preoperative assessment and management of the patient with a major venous injury.
12. To understand the characteristic signs and symptoms of AVFs.
13. To define the mechanism of the iatrogenic injury.
14. To understand the management and potential complications associated with an iatrogenic injury.

Venous Thromboembolic Disease

1. To understand the classic triad of stasis, hypercoagulable state and vein wall damage leading to venous thrombosis
2. To understand other risk factors such as malignancy, older age, obesity, long bone fractures, joint replacement, pelvic operations and a previous history of DVT/PE.
3. To be familiar with the known hypercoagulable states including anticardiolipin/antiphospholipid antibodies, lupus anticoagulant, protein C and protein S deficiency, antithrombin III deficiency, hyperfibrinogenemia, plasminogen deficiency, factor V Leiden mutation (activated protein C resistance), heparin induced thrombocytopenia, Coumadin (warfarin) induced skin necrosis.
4. To be familiar with the signs, symptoms and non-invasive and invasive tests currently used in the diagnosis of DVT and PE.
5. To describe the management of DVT and PE including heparin treatment and the role of chronic anticoagulation.
6. To recognize the importance of monitoring platelet counts during heparin therapy, and the diagnosis and treatment of heparin induced thrombosis.
7. To know reasons why warfarin should be avoided during pregnancy.
8. To understand the typical signs/symptoms and the usual chest x-ray, blood gas and EKG findings in patients with large pulmonary emboli.

Chronic Venous Insufficiency

1. To review normal venous anatomy: superficial, deep and perforating veins, greater saphenous vein (GSV), lesser saphenous vein (LSV), femoral, popliteal & tibial vessels.
2. To review the epidemiology of chronic venous insufficiency.
3. To understand that chronic venous disease is defined as an abnormally functioning venous system caused by venous valvular incompetence with or without venous outflow obstruction which may affect the superficial venous system, the deep venous system or both.

4. To understand and differentiate the three etiologic categories of venous dysfunction: congenital, primary (acquired, undetermined cause) and secondary (acquired, e.g. post-thrombotic or post traumatic).
5. To differentiate the clinical features of superficial venous insufficiency from deep vein (or combined) insufficiency.
6. To review the noninvasive and invasive evaluation of the venous system including ascending & descending venography, photoplethysmography, air plethysmography, and duplex scanning.
7. To describe the characteristics of venous stasis ulcers and differentiate from other types of ulcers including arterial, neuropathic, malignant, infectious and inflammatory (vasculitis).
8. To differentiate stasis dermatitis from other causes of dermatitis in the lower leg.
9. To describe the types of available therapy for superficial venous insufficiency (varicose veins) including elastic stockings, elevation, sclerotherapy, laser treatment, stab avulsion, stripping.
10. To define the principles of non-operative management of lower extremity chronic venous insufficiency: ambulation, elevation, and elastic support.
11. To describe the non-operative management of venous stasis ulcers including UNNA Boot, etc.

Lymphedema

1. To know the classification of causes of lymphedema including: primary lymphedema to include congenital (onset before one year of age), Non-familial, Familial (Milroy's Disease), primary lymphedema, praecox (onset 1 to 35 years of age) Non-familial, familial (Meige Disease), primary lymphedema tarda (onset after 35 years of age) and secondary lymphedema, including filariasis, lymph node excision and radiation, tumor invasion, infection, and trauma.
2. To understand classic clinical classifications of lymphedema based on etiology (primary vs. secondary), genetics (familial vs. sporadic), and time of onset.
3. To understand the techniques of non-operative management of primary and secondary lymphedema.

Extremity Amputation

1. To understand the various pathophysiologic conditions that lead to the need for an extremity amputation.
2. To define when amputation offers improved quality of life.

3. To understand the importance of proper amputation level selection.
4. To define the methods of determining amputation level by clinical criteria.

Vascular Access

1. To know that arterial and venous anatomy involved in the commonly placed grafts and sited for hemodialysis in the upper and lower extremities; know the options for unusual grafts sites when extremities are not available.
2. To know the local and systemic, anatomic effects of creating an arteriovenous fistula for the purpose of hemodialysis.
3. To know the anatomic and physiologic etiologies for arterial steal, decreased extremity flow and venous hypertension in AV fistulas created for hemodialysis.
4. To know the physical exam and diagnostic tests used in selecting a site for a vascular access including Allen's test and use of duplex screening of veins.

Thoracic

Describe the evaluation of a solitary pulmonary nodule versus a centrally located lung mass

Discuss the indications for mediastinoscopy

Discuss the value of PET scanning in lung cancer

Describe the work up of an esophageal cancer

Be familiar with the surgical options for esophageal cancers at the gastroesophageal junction

Be able to clinically stage lung and esophageal cancers

Perform selected operative procedures or selected parts of the following procedures:

Pacemaker insertion

Video assisted thoracic surgery (VATS) for empyema and spontaneous pneumothorax, lobectomy for lung cancer, mediastinoscopy, and gastroesophagectomy for esophageal cancer

Attend tumor board conferences relating to new lung or esophageal tumors

Level specific goals

Intern

Vascular

Assess patients' vascular systems using appropriate skills in history-taking and clinical examination

Review arterial and venous anatomy

Describe basic arterial and venous hemodynamics

Be familiar with the basic clinical manifestations of:

Obstructive arterial disease

Aneurysm arterial disease

Thromboembolic disease

Chronic venous insufficiency

Demonstrate skill in basic surgical techniques including:

Knot tying

Exposure and retraction

Knowledge of instrumentation

Incisions

Closure of incisions

Handling of graft materials

Demonstrate proficiency in venous access procedures

Participate in surgery for varicose vein disease and in the creation of arteriovenous fistula for hemodialysis

Thoracic

Review anatomy of the lung and esophagus

Be familiar with the appropriate diagnostic and therapeutic modalities for the following conditions:

Spontaneous pneumothorax

Empyema

Malignant pleural effusion

Esophageal cancer

Lung cancer

Evaluate the operative risk for a patient undergoing thoracic surgery

Perform tube thoracostomy

Attend tumor conferences relating to new lung or esophageal tumors

Fourth Year

Vascular

Outline indications for operations for lower extremity occlusive arterial disease, aortic aneurysm, aortic dissection, carotid stenosis, amputation

Outline the procedures for managing vascular surgical emergencies such as acute tissue ischemia or ruptured aortic aneurysm

Illustrate the operative exposure of major vessels including:

- a. Aortic arch
- b. Carotid artery
- c. Descending thoracic aorta
- d. Proximal subclavian artery
- e. Suprarenal aorta
- f. Femoral artery
- g. Infrarenal aorta
- h. Popliteal artery

Perform selected operative procedures or selected parts of the following procedures:

Aortic aneurysm repair including endovascular stenting

Carotid endarterectomy

Aorto-iliac occlusive disease

Femoral popliteal occlusive disease

Arteriovenous fistula

Ligation and stripping of varicose vein disease

Thoracic

Describe the evaluation of a solitary pulmonary nodule versus a centrally located lung mass

Discuss the indications for mediastinoscopy

Discuss the value of PET scanning in lung cancer

Describe the work up of an esophageal cancer

Be familiar with the surgical options for esophageal cancers at the gastroesophageal junction

Be able to clinically stage lung and esophageal cancers

Perform selected operative procedures or selected parts of the following procedures:

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Attend tumor board conferences relating to new lung or esophageal tumors

Practice Based and Life Long Learning:

1. Develop a personal program of self-study and professional growth with

guidance from the teaching staff and senior residents. An understanding of the etiology, pathogenesis, pathophysiology, diagnosis and management of vascular surgery disorders will allow for sound surgical judgment, which relies on knowledge, rational thinking, and the surgical literature.

2. Utilize current literature resources to obtain up-to-date information in the vascular patients and practice evidence-based medicine.
3. Participate in teaching and organization of the educational weekly conferences.
4. Participate in activities of the Department of Surgery (including all teaching conferences) and assume responsibility for teaching and supervision of subordinate surgical house staff, and medical students.
5. Participate in the Department Morbidity & Mortality conference and utilize information to further improve patient care.
6. Participate in daily teaching rounds and be able to present patients in an organized and complete fashion.
7. Topic of the day in the computerized life long learning portfolio

Professionalism:

1. Practice compassionate patient care maintaining the highest moral and ethical values with a professional attitude.
2. Demonstrate an understanding of the needs and feelings of others, including the patient's family members, allied health care personnel (nurses, clerical staff, etc.), fellow residents, and medical students.
3. Communicate and collaborate effectively in a team of health care providers.
4. Demonstrate respect, compassion, and integrity in the care of cardiac surgery patients on a daily basis.
5. Demonstrate a mature and educated approach to ethical issues commonly encountered in a cardiac surgery setting.
6. Show sensitivity to patients' culture, age, gender, and disabilities.
7. Recognize and appropriately handle sensitive cases of abuse.
8. Be self-aware and have a knowledge of professional limits by practicing on-going medical education and self-improvement.
9. Be accountable to the profession in your actions and decisions.

Interpersonal Relationships and Communication:

1. Create and sustain a therapeutic and ethically sound relationship with patients and patient families.
2. Work effectively with other members of the medical team including allied health

care personnel (nurses, clerical staff, etc.), fellow residents, and medical students.
3. Maintain professional interactions with other health care providers and hospital staff.

Systems Based Practice:

1. Understand how the health care organization affects surgical practice of vascular and thoracic surgery.
2. Demonstrate cost effective health care.
3. Be able to coordinate multi-specialty and multidisciplinary trauma care practice including discharge planning, social service, rehabilitation, and long term care.
4. Follow established practices, procedures, and policies of the Department of Surgery and integrated and affiliated hospitals.
5. Maintain complete of medical records, operative notes, staff sheets and notes, patient database cards, and other patient care related documentation in a timely, accurate, and succinct manner.

READING MATERIALS:

Educational materials which will function as guides for resident education during this course include but are not limited to:

1. The SCORE General Surgery Resident Curriculum Portal accessed at <https://portal.surgicalcore.org/home>
2. Schwartz's Principles of Surgery
3. Zollinger's Atlas of Surgical Operations
4. The Surgical Core Curriculum accessed via Access Surgery through the University of Illinois-Chicago website

OUTCOMES:

Outcomes for the various goals and procedures in this curriculum will be assessed along the following standards:

1. Superior: the resident exhibits conceptual understanding beyond that which is described in this bulletin, and practice performance which is at a standard for a resident at a more advanced PGY year.
2. Above-Average: the resident has shown understanding and performance that is above what is expected for the rotation.
3. Competent: the resident exhibits conceptual understanding and practice

based performance standards that are minimal, for the appropriate PGY year, for advancing towards general surgical practice.

4. In Need of Remediation: the resident has failed to grasp the basic concepts and practices necessary to advance past this rotation for the PGY year, and shows need of repeating or training augmentation